MONTANA UNDERGROUND STORAGE TANK PROGRAM NEWSLETTER

MUST News

Montana Department of Environmental Quality

Your Flex Connectors and You

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Have you checked your flex connectors today? Have you checked them in the last year?In the last three years? What would you be looking for if you DID check them? PEI/RP-900 *Recommended Practice for the Inspection and Maintenance of UST Systems* suggests checking visible flex connectors annually to make sure they are not twisted, kinked, or bent beyond the manufacturer's specifications and that they are protected from corrosion.

However, the proper installation of flex connectors is just as important as inspection. *DEQ Underground Storage Tank Critical Installation Requirements* states that flex connectors must be installed in the product and vapor recovery piping at the tank, at the base of dispensers, and anywhere a direction change of 30 degrees or more occurs with less than a 4' straight run on either side of it. It also states that flex connectors in contact with soil must be protected from corrosion by heat shrink sleeves, watertight boots, or STI coating and anodes. Flex connectors must be UL listed for hydrocarbons, and if they are exposed to the atmosphere, they must be fire rated.

UL 2039, *Outline of Investigation for Flexible Connector Piping for Fuels*, outlines the vigorous "worst case scenario" situations that flex connectors are subjected to in order to become UL listed, including up to 250,000 cyclic tests, bending tests, drop tests, and UV exposure tests. Manufacturers of UL listed flex connectors refer to UL 2039 as a reference for the cycle life, or the number of cycles completed by an assembly before failure, of their flexes. What that means to owners and operators of UST systems is that flex connectors have a cycle life! There is a limited number of times flex connectors can withstand vibration, cyclic pressure surges, and cyclic displacement and twisting.

UL 2039 also requires that installation instructions and maintenance instructions be supplied with every flex connector. Installation instructions must provide information about pressure rating, location rating, fitting torque ratings, and minimum bend radius. Maintenance instructions must include a recommended field leak test method and procedure and information about the maintenance required for continued leak-tight use.

Bend radius (figure 1), measured from the inside curvature to the centerline of the bend, is the minimum radius a flex connector can be bent without kinking it or damaging it. Exceeding the rated minimum bend radius can shorten the life of a flex connector considerably. The bend should be located as close to the center of the flex connector as possible.

An easy way to check the bend radius of a flex connector during installation is with a cardboard template:

- Cut a piece of cardboard to the minimum bend radius of the particular flex connector you want to check, then hold the template against the inside of the bend.
- If the bend is the same size or larger than the radius on the template, the bend is okay.
- If the template doesn't fit, the bend radius is too small!

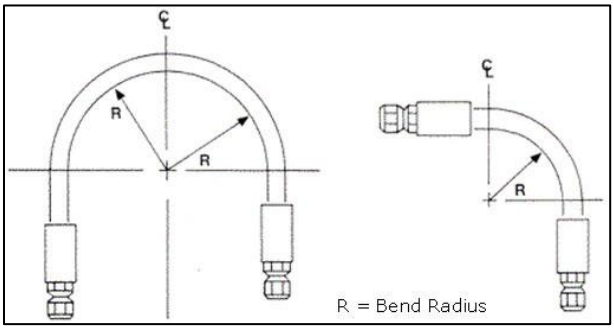

FIGURE 1: Bend Radius (R) is measured from the inside curvature to the center line of the bend (CL).

Don't let a failed flex connector happen to you (figure 2)! Owners, operators, installers, and inspectors of UST systems need to be aware that flex connectors, like all other components of an UST system, have a limited service life. Special care must be taken during installation of flex connectors to ensure they are installed correctly, that they are rated for the environment they will be in, and that they are designed for the substance they will contain (contact the manufacturer for this information). Flex connectors that are visible should be inspected, at least annually, to ensure they are not twisted, kinked, or bent.

FIGURE 2: A failed flex connector.

Have you checked your flex connectors today?